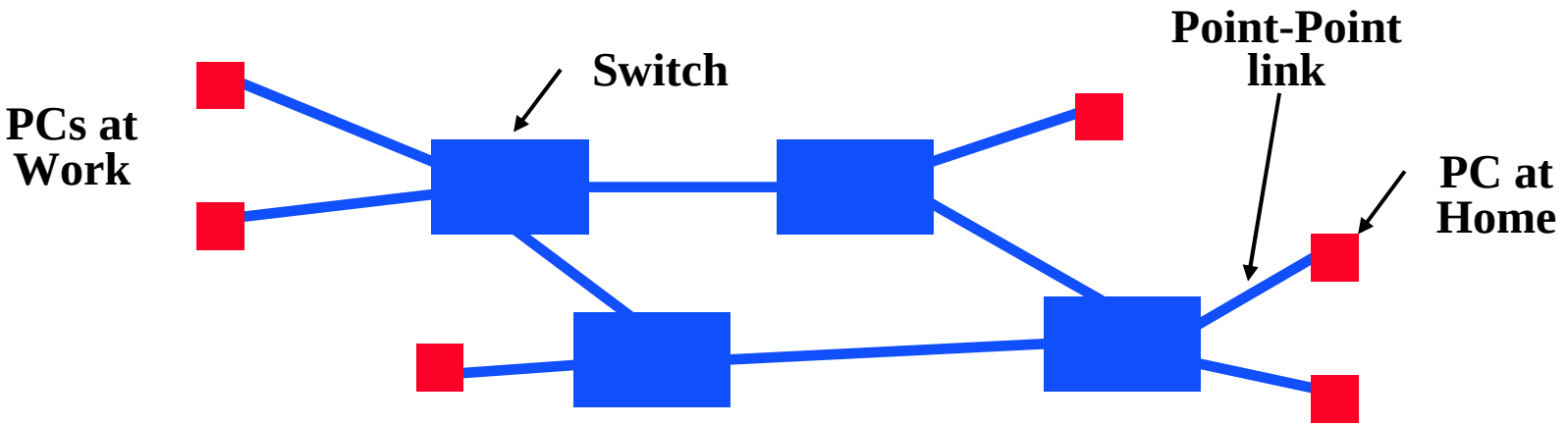
A Switch-based Network

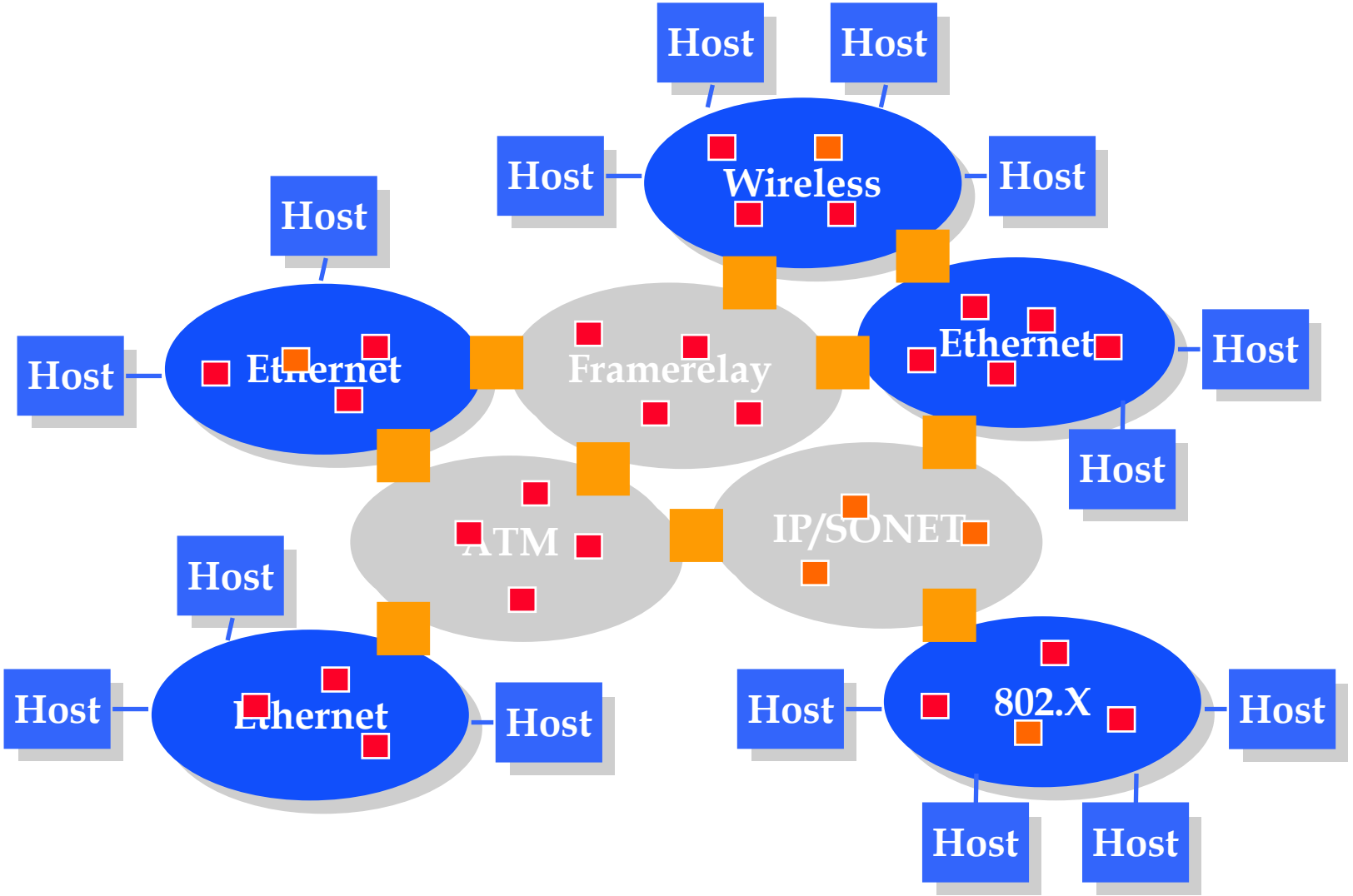
- Switches are connected by point-point links.
- Packets are forwarded hop-by-hop by the switches towards the destination.
  - » Forwarding is based on the address
- How does a switch work?
- How do nodes exchange packets over a link?
- How is the destination addressed?



Switching Introduction

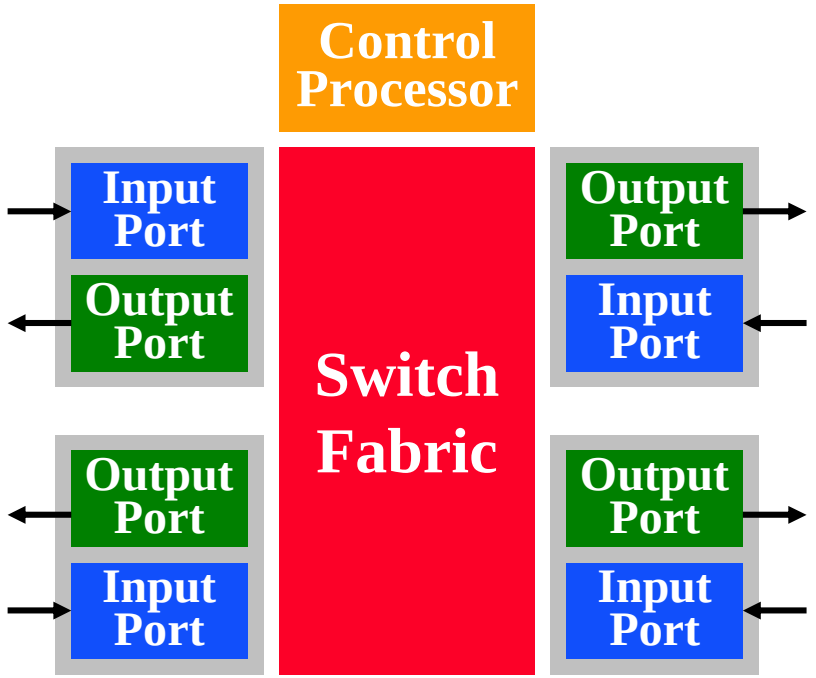
- **Idea: forward units of data based on address in header.**
- **Many datalink technologies use switching.**
  - **Virtual circuits: Framerelay, ATM, X.25, ..**
  - **Packets: Ethernet, MPLS, …**
- **“Switching” also happens at the network layer.**
  - **Layer 3: Internet protocol**
  - **In this case, address is an IP address**
  - **IP over SONET, IP over ATM, ..**
  - **Otherwise, operation is very similar**
- **Switching is different from SONET mux/demux.**
  - **Statically preconfigured channels - no addresses**

An Inter-network

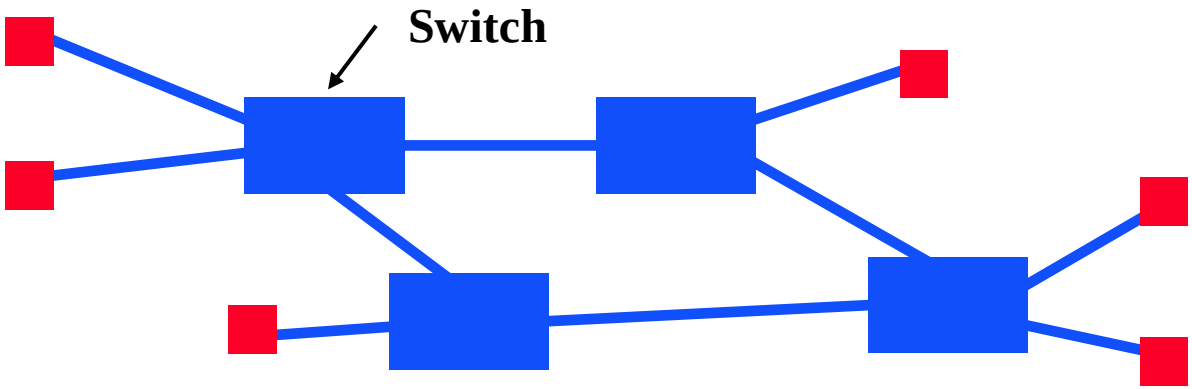


Switch Architecture

- Takes in packets in one interface and has to forward them to an output interface based on the address.
  - A big intersection
  - Same idea for bridges, switches, routers: address look up differs
- Control processor manages the switch and executes higher level protocols.
  - E.g. routing, management, ..
- The switch fabric directs the traffic to the right output port.
- The input and output ports deal with transmission and reception of packets.



Packet Forwarding: Address Lookup



Address	Next Hop	Info
B31123812508	3	13
38913C3C2137	3	-
A21023C90590	0	-
128.2.15.3	1	(2,34)

- Address from header.
  - » Absolute address (e.g. Ethernet)
  - » (IP address for routers)
  - » (VC identifier, e.g. ATM))
- Next hop: output port for packet.
- Info: priority, VC id, ..
- Table is filled in by routing protocol.